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ABSTRACT

The importance of myth and ritual in understanding the use of computer simulators in higher education is considered. Myths are commonly held beliefs that maintain social solidarity and reduce ambiguity; rituals serve a similar function, but they involve actions in addition to words. Examples of common myths and rituals are used to illustrate the concepts, and widely used cost simulation models are briefly reviewed. Cost simulation models, also known as resource requirement models, are one of the most widespread applications of computer simulators. These models calculate the resources an institution will require for a desired level of activity. An Induced Course Load Matrix (ICLM) is the foundation of most resource simulation models. Two cost simulators are the Comprehensive Analytical Model for Planning in the University Sphere (CAMPUS) and the Resource Requirements Prediction Model (RRPM). A final type of computer simulator, the trend projection model, is a more recent development. TRADES is the first model to explicitly incorporate trends in its forecast routines. An easily adaptable simulator based on TRADES is a model building system, EDUCOM's Financial Planning Model (EFPM). Technical issues pertinent to the evaluation of the simulators are addressed, as are organizational issues. Among the myths surrounding the simulators are the following: a comprehensive decision system can be built; better systems will lead to better decisions; and vendor-supplied management systems will meet institutional needs. Myths about managerial activities, planning that becomes a ritual without resulting in action, and the concept of a community of scholars who reach decisions by discussion and consensus are also addressed. A bibliography is appended. (SW)

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Simulators, Myth, and Ritual in Higher Education

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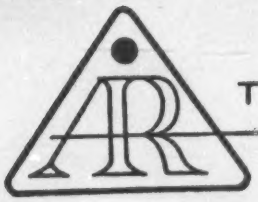

THE ASSOCIATION FOR INSTITUTIONAL RESEARCH

This paper was presented at the Twenty-Second Annual Forum of the Association for Institutional Research held at the Denver Hilton Hotel in Denver, Colorado, May 16-19, 1982. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum papers.

D. R. Coleman, Chairman
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Abstract

Evaluations of widely used computer simulators identify a number of technical and organizational factors that are related to the simulator's success. But investigations have ignored two unobtrusive aspects of organizational behavior---myth and ritual. Myths are commonly held beliefs that maintain social solidarity and reduce ambiguity. Rituals serve a similar function, but they involve actions in addition to words. The paper uses examples of common myths and rituals to illustrate the concepts. A brief review of widely used cost simulation models and a discussion of their evaluation follows. The discussion demonstrates the importance of myth and ritual in understanding the use of computer simulators in higher education.

College and university administrators are using an increasing variety of computer-based tools. One popular management aid is a computerized simulation model. Such tools allow the decision maker to model the institution and observe the effects of policy changes and external factors. Evaluations of simulators describe a number of technical and organizational factors that contribute to their success or failure. This paper introduces the concepts of myth and ritual--unarticulated beliefs and actions that produce social cohesion and explain ambiguity--as another set of organziational influences on simulators. Then, after a brief review of widely available simulators and their evaluations, the paper applies the concepts of myth and ritual to the simulator literature. It demonstrates that myths and rituals further explain the use of computer-based simulation models.

I. Myth and Ritual: Unobtrusive Organizational Forces

A variety of mechanisms control the behavior of individuals in organizations. Leifer (1979) argues that there are three levels of organizational control. The first level consists of explicit control mechanisms that have a highly visible influence on behavior. Examples include leadership activities and the size, shape, and arrangement of office space. The second level, implicit control mechanisms, are less visible but still observable. Organizational design and authority illustrate the implicit controls. Leifer labels the third level unobtrusive or unconscious because most organizational members are unaware of their operation. Organizational values and assumptions are examples of unobtrusive forces.

Leifer suggests that unobtrusive forces arise from the construction of individual social realities. He states that every individual builds his or her own reality out of our complex environment. Organizational leaders trans-

mit their personal reality to those around them through various unobtrusive controls. Meyer and Rowan (1978) suggest that external societal influences also provide unobtrusive influences on organizational structure and function. Thus personal and societal forces combine to form unobtrusive organizational controls.

Unobtrusive controls become more important when explicit and implicit controls are weak. This is the case in colleges and universities. Cohen and March (1974) describe such institutions as organized anarchies--organizations with vague goals, unclear technologies, and fluid participation. Furthermore, the organizational environment of colleges and universities is highly ambiguous. Cohen and March define four basic ambiguities: (1) purpose--while most institutions have a statement of goals, they usually are vague and prompt debate among members of the academic community, (2) power--research shows that college presidents have much less power over their institutions than commonly believed, (3) experience--the rapidly changing environment of higher education makes it difficult for administrators to learn from experience, and (4) success--it is difficult to measure any educational output against which to gauge success or failure. These ambiguities and the environment of organized anarchy undermine the explicit and implicit control mechanisms in colleges and universities. This gives additional importance to the unobtrusive level. Two types of unobtrusive forces, myth and ritual, are particularly helpful in explaining organizational behavior under such conditions.

Myth: Many individuals think pejoratively of myths. They believe that myths are unfounded beliefs held by primitive tribes or a vestige of our past which are incompatible with civilized thought. This is not the case. Myths continue to play an important role in shaping human behavior. Cohen (1969)

describes seven functions of myths. Two of these--providing social solidarity and explaining ambiguity--are of particular interest here.

In his studies of Melanesian culture, Malinowsky observes that myths are an important and integral cultural force, serving to "establish a sociological charter" (1926, p. 89). He reports that myths function to maintain social solidarity and cohesion. Myths also serve as explanations. Under conditions of uncertainty, myths protect individuals from awareness of ambiguity. Cohen sums up Levi-Strauss' view of myth in this way, "It is a device for mediating contradictions or oppositions as experienced by men" (1969, p. 346). Thus myths are unobtrusive organizational controls because they provide a common explanation for ambiguity and a sense of social order. The value of myths for explaining behavior is best understood through an example such as the myth of rational decision making.

Western analysts and thinkers have long proclaimed the rational mode of thought. It dominates our society and academic training. As commonly defined, the rational approach consists of clarifying objectives, determining all possible means of reaching the objectives, examining the consequences of each alternative means, and selecting the means that best satisfies the objectives. This is a comprehensive approach that links actions to goals.

Lindblom (1959) suggests that it is difficult to comply with the rational model; it is too complicated and uncertain. In its place he proposes a process known as "muddling through." This is similar to the rational approach, but entails smaller steps and "successive limited comparisons." The method reduces the rational approach to a more manageable size. Leavitt (1977a, 1977b) also questions the rational method and suggests certain nonrational methods as alternatives. Each author expresses doubts about the rational

method and suggests new approaches, but neither argues that the rational method is untrue.

Another view holds that the rational decision maker is a modern myth. Rowe (1974) finds convincing evidence that rationality does not prevail in organizational decision making. Instead, managers operate with a "subjective reality" based on individual preference. Rowe states that

> ...as long as one persists in the belief that choices are made on the basis of a rational thought process, one has little chance of predicting or understanding most business decisions (1974, p. 4^).

Although decisions may not be rational, the myth "explains" the process of decision making in a complex organization and lends credibility to the decision-making process. In addition, the myth unifies those within the organization because everyone operates with the same set of beliefs.

Ritual: A second form of unobtrusive control, ritual, is closely related to myth. But unlike myths, rituals involve actions rather than words. They are

> ...stylized or formalized behavior made in repetitive form....the fundamental criterion of ritual is the idea of formality of procedure or action that either is not directed toward a pragmatic end, or if so directed, will fail to achieve the intended aim (Burnett, 1969, p. 1,3).

Rituals may be associated with myths and may have mythical objectives, but this is not always true. As with myths, rituals can serve many functions. One is to help stabilize and order groups. Kamens reiterates the Durkheimian theme that rituals "dramatize and validate the assumption of membership in a corporate group" (1977, p. 210). Trice, Belasco, and Alutto (1969) argue that rituals generate consistency between the expectations of related organizational members. Rituals also provide an explanation and understanding of uncertainty. Manning suggests that rituals "provide certainty in the face of the potential chaos of social intertactions" (1979, p. 306). When facing the unknown, rituals reduce anxieties and ambiguities by providing familiar and formalized behavior (Trice et al., 1969). Thus ritualized action is another means of shaping behavior when faced with uncertainty. Several brief illustrations demonstrate the value of ritual in understanding organizational behavior.

In recent years there has been a vast growth in federal spending on social programs. Typically, research teams evaluate these programs to determine if the program has met its goals and if funding is wisely spent. Often, however, the research fails to influence subsequent governmental decisions. Floden and Wiener (1978) suggest several likely explanations. One is that evaluation studies are ritualized activity. Evaluations reduce anxieties about social programs because legislators can cite research results as evidence about program outcomes. Evaluations reinforce the image of government rationality, efficiency, and accountability. Evaluation reports answer questions about decisions regarding allocation of funds and program authorization. Evaluations reduce these uncertainties but have little lasting impact. Yet their use continues, thus demonstrating their value as ritual.

Meyer and Rowan (1978) provide another illustration. They describe how colleges and universities may offer programs of study even though students are not interested in them. The ritualized offering of these programs validates the institution and maintains the appearance of legitimacy. The ritual provides an explanation for the school's existence and stabilizes its environment.

The unobtrusive nature of organizational myths and rituals makes them difficult to detect. Because they are such an integral part of the organization, they are accepted as true and, in most cases, never acknowledged or questioned. This can lead to a misconception about the causal relationship between action and outcome. Explicit actions often receive credit for producing results in organizations. Yet, it appears that myth and ritual may mediate action (Deal and Rallis, 1980). Particularly under conditions of uncertainty, it is likely that myth and ritual are intermediate steps, shaping behavior and influencing outcomes in an unobtrusive manner. Section IV of this paper demonstrates the influence of myth and ritual on the simulators which are introduced in Section II and Section III.

II. The Simulators

Rodgers and Rhodes (1978) report that fifty-five percent of college and university administrators have used some kind of computer based planning tool. They use models because building one forces greater understanding of the institution. It is difficult to abstract a set of equations from complex behavior if the institution is not well understood. A model can also predict future behavior. It permits the user to experiment and examine behavior under different conditions and assumptions. This process is known as simulation because the model is being used to replicate the institution's behavior.[1] The

simulator enables the decision maker to ask "what if..." questions and so explore quickly and easily the effects of various policy options. Administrators use simulators as aids in a variety of areas.[2] Institutions have developed models for course scheduling and enrollment projections. Administrators have also used simulators to assess the effect of personnel policy on tenure ratios, faculty age distributions, and turnover rates.

Cost simulation models, also known as resource requirement models, are one of the most widespread applications of computer simulators. These models calculate the resources an institution will require for a desired level of activity (Hopkins, 1971). In other words, given a projected enrollment and the costs of educating students in each of the college's departments, the model projects the budgetary needs of each unit. Administrators can use the model to examine the effects of policy changes such as shifting faculty workloads or staffing requirements. The cost simulation models were a product of an expanding educational system that wanted to know how to divide its resources among competing programs and plan for increased enrollments. Later, as predictions of decline appeared, colleges used the models to examine the effects of enrollment or budget reductions.

An Induced Course Load Matrix (ICLM) is the foundation of most resource simulation models. The matrix, developed by Suslow, assumes that

> there is a measurable and relatively high propensity for a student in a particular major field at a particular class level to enroll in a selection of courses similar to the selection of courses taken by his or her peers (1976, p. 37).

In addition, it assumes that patterns of course selection tend to remain relatively constant over time. Thus, given enrollments for each major, it is possible to predict what courses the school must offer. The model also calculates the level of resources necessary to support institutional activities from historical data on costs, workloads, and the like.

One of the earliest cost simulation models made available for generalized use is the Comprehensive Analytical Model for Planning in the University Sphere (CAMPUS) (Judy and Levine, 1965; Judy, 1969). CAMPUS generates reports on facility requirements and detailed budgets. Its projections are at the course level. The University of Toronto Faculty of Arts and Sciences first used CAMPUS to help allocate resources among expanding programs. Ontario's twenty-two Colleges of Applied Arts and Technology also used CAMPUS as a planning tool for about six years (Foreman, 1974; Nobel, Stoll, and Calvert, 1978).

A second widely used cost simulator is the Resource Requirements Prediction Model (RRPM) (Gulko and Hussain, 1971; Clark, Huff, Haight, and Collard, 1973; Gamso, 1977).[3] The model grew out of the early work done on cost simulation models at the University of California (Weathersby and Weinstein, 1970). While similar in function and use to CAMPUS, RRPM differs in detail. Users can more easily adapt RRPM to their campus because it permits them to define institutional characteristics. It uses an ICLM and enrollment projections to calculate line-item budgets for each organizational unit, program budgets with departmental contributions, and institutional summary reports. Unlike CAMPUS, RRPM does not project to the course level. It is, however, less expensive to obtain and run, and it requires less data to operate.

A final type of computer simulator, the trend projection model, is a more recent development. In an era of declining resources and rising costs, many institutions face severe budget cuts and deficits. Administrators at Stanford University developed a series of models to help them understand and cope with these problems (Hopkins and Massy, 1981; Dickmeyer, 1979). Their efforts culminated in a model (TRADES) that allows users to trade-off different financial policies and observe their effects on Stanford's budget. TRADES is the first model to explicitly incorporate trends in its forecast routines. Through its use, Stanford administrators learned that achieving financial equilibrium would require control of the absolute levels of spending and the growth trends of revenues and expenses. Application of these principles was associated with the elimination of a ten million dollar deficit over a five year period and the introduction of a trend equalization program.

Widespread commentary on the success of TRADES soon aroused the interest of administrators at other institutions. But attempts to modify TRADES for use by others demonstrated that while this was possible, the model reflected Stanford's unique structure and problems (Powell, 1979; Wyatt, Emery, and Landis, 1979). EDUCOM obtained funding from the Lilly Foundation to produce an easily adaptable simulator based on TRADES (Updegrove, 1978; Knodle, Noval, Powell, Rogers, and Updegrove, 1979).[4] The result is a model building system known as EDUCOM's Financial Planning Model (EFPM).

Over one hundred institutions currently use EFPM to meet their specific needs (Jones, Updegrove, Orcutt, and Merrill, 1980). Common uses include budget projections and analyses of how to achieve financial equilibrium within a set of user-imposed constraints on both institutional resources and policy options. In addition, it is possible to build models for the evaluation of

other trend projection problems such as personnel policy, enrollment patterns, and housing needs. The model resides on the Cornell University IBM 370/168, and all users access it there.

III. Evaluation of the Simulators

Plourde (1976) reports that forty-seven percent of the users of several cost simulators view the models as pilot projects and twenty percent do not plan to use them past the testing stage. Fifty-seven percent feel that models are somewhat successful at their institution. This compares to a satisfaction rate of seventy-three percent among nonacademic simulator users (Watson, 1978). Zemsky, Porter, and Oedel (1978) argue that colleges and universities are not subject to the same quantifiable functions that apply to businesses and hence are more difficult to model. The incorrect application of modeling techniques could account for the lower satisfaction rate among academic users. But other technical and organizational problems exist as well.

Technical Issues: Technical problems are becoming less important as sophistication and experience with simulators increase, but several still exist. A common technical issue is the lack of complete and accurate data on which to base the simulator's calculations (Johnstone, 1974). And models which use historical data run the risk of incorporating past inaccuracies and inefficiencies (Hopkins, 1971). This problem is particularly severe for simulators such as CAMPUS because they need tremendous amounts of data. Hussain (1976a), for example, estimates that the implementation of CAMPUS at the University of Colorado required over twenty-four million pieces of information. Translating institutional data into the format required by a simulator can cause a delay (Farmer, Frame, Priest, and Ozment 1978). And inflexible tech-

nical design also hinders implementation. Thus models often suffer from structural rigidity, strict data requirements, and predetermined report formats. Bloomfield and Updegrove (1980) suggest that decision makers should use smaller, more flexible models such as EFPM.

Critics have also raised serious questions about the validity and reliability of the Induced Course Load Matrix--the foundation of many cost simulation models. ICLM projections vary up to forty percent from actual demand (Schroeder, 1973) and faculty requirement coefficients can change by two hundred percent each year (Hopkins, 1971). The cost simulation models often cannot distinguish between variables that the institution can directly control, such as maximum class size, and variables that depend on environmental influences, such as average class size (Hopkins, 1971).

Hussain (1976b) suggests solutions to several of these technical problems. He proposes that institutions obtain all necessary data and establish a process for doing this before implementing a model. Once the model is in place, he suggests that the college try it on the institution's computer with validated test data. (Curiously, it is not until <u>after</u> these steps that he considers the actual usefulness of the system.) In a similar vein, Wyatt (1979) recommends assessment of the data's validity and reliability. He also suggests that the institution's first simulator should be fairly simple and straightforward. This helps users become familiar with the model and, at the same time, helps the modelers learn more about the users' needs.

The many improvements incorporated in a recent model such as EFPM demonstrate that model builders have made technical progress. Yet problems still exist. As Gray notes,

> researchers are getting better and better at representing higher educational systems and in understanding the complex processes involved. More and more models of higher quality seem to be being produced. However, these models may not be making a significant impact on the higher education system itself (1977, p. 18).

Apparently, technical difficulties are not the only reason for problems with simulator use. In fact, Keen states that "technical competence...in no way compensates for inadequate resolution of behavioral issues" (1978, p. 38).

Organizational Issues: Kirschling (1976) identifies two behavioral problems. There is a tendency for the technical staff, consultant, or researcher who implements the model to think that those using the model are "stupid" and not just ignorant. Second, these two parties often fail to be totally open with each other, particularly concerning the model builder's assumptions. Such communication problems appear in virtually every evaluation article.

Enarson describes what can happen if the model maker becomes too engrossed in technical details and loses sight of the original problem. He calls this the "Beagle Fallacy":

> If you have never walked the woods with a beagle, you have missed a delightful experience. The beagle has a superb nose and follows the scent of the trail with total absorption. But the beagle has poor eyesight and seldom looks up to see the rabbit staring quietly (and I trust with amusement) at him (1974, p. 172).

Similar difficulties arise when the modeler defines the problem either too narrowly or broadly, or collects data just because it is there.

Implementation of the simulator can pose another organizational problem. Some administrators view the implementation process as a necessary inconvenience. Gaunt and Haight (1977) and Alter (1976) suggest, however, that the process of developing a simulator can be extremely beneficial. It may provide new knowledege about the institution and identify additional problems that administrators could model. Ignoring these unexpected benefits might lead to rejection of a useful simulator.

Keen (1975) notes that for maximum value, evaluation of a simulator should be an ongoing part of the implementation process so that necessary changes can be made in the model. This is a major shift from the position taken by one of CAMPUS' creators:

> Few university administrators are accustomed to using the type and volume of information that can be provided by a good systems analysis group. Certain changes in managerial style of thinking are necessary before this information can be used to best advantage (Levine, 1969, p. 65).

Modelers now recognize that a simulator must be compatible with the organization in which it operates. In order to facilitate this, they have provided users of computer simulators with a complete laundry list of hints for successful implementation (Wartgow, 1971; Hammond, 1974; Keen, 1978; Baldridge and Tierney, 1979; Wyatt, 1979). What is striking about these lists is their similarity. This suggests that modelers and administrators should take them seriously. The lists emphasize that:

- the organization's first simulator should closely resemble established institutional methods to help users feel at ease;
- a manager, not a modeler, should be in charge of the simulator, and these roles should be clearly defined;
- users should participate in developing the model, explicitly defining the model's goals, and treating the development of a model as a process, not the creation of a final product;
- each project needs an executive "Godfather" to provide support (this is particularly true for models obtained from consultants);
- the model should readily display the outcomes of alternative policies and prompt debate on the issues, and thus support the decision-making process;
- knowledge of organizational change facilitates resolution of organizational issues; and
- in-service training and education can reduce resistance to change.

The success of TRADES at Stanford illustrates the importance of organizational acceptance for the model (Watkins, 1980). First, top management designed the model and tailored TRADES to Stanford's needs and characteristics. Second, the model followed a bottom-up approach. Those administrators, faculty, and staff who had expertise in particular areas collected data and projected trends. Finally, the model did not make decisions, it helped decision makers evaluate their options. Although it was technically competent, the model still needed organizational support.

Despite the many problems and criticisms of simulators, few critics are ready to scrap them altogether. Plourde (1976) suggests that better models are not needed. Instead, administrators should make better use of the models that are available. Hope remains that the models will find their proper place in the university decision-making structure. The many organizational issues surrounding the implementation of computer simulators are worthy of the attention they have recieved. The introduction of a simulator is an organizational change that can cause major disruptions. Awareness of political pressures that surround their use is also beneficial. And without the support of top management, no project will survive for long. Thus, the organizational issues are paramount, and the suggestions outlined above are helpful.

The simulator evaluation studies and recommendations for implementation demonstrate the influence of Leifer's explicit and implicit control mechanisms. Many authors, for example, cite a need for the support of top management--an explicit control. Keen (1978) emphasizes awareness of organizational politics and the social or behavioral aspects of simulator implementation--implicit controls. But unobtrusive forces and their impact on the computer simulator are not mentioned. McFarlan (1973) implicitly suggests that such factors may be important. He classifies computer-related projects along two dimensions: the project's relation to the organization's experience with technology and the degree of organizational structure present. The majority of college and university simulation projects have high company-relative technology (the project involves hardware-software features which previously have not been used) and low inherent structure (judgment and flexibility exist in the project's implementation). According to McFarlan, this combination is extremely risky and projects in such an environment have little chance of suc-

cess. McFarlan's scheme reflects the importance of the explicit technical and organizational issues. His discussion of "low inherent structure" also implcitly refers to the conditions of ambiguity and uncertainty present on the college and university campus that increase the risk of computer-related projects. These conditions prompt consideration of myth and ritual.

IV. The Myths and Rituals of Simulators

I believe that recognition and discussion of myth and ritual is beneficial for the administrator who is using, or who is considering the use of, a computer simulator. Myths and rituals influence simulators in two ways. First, they are associated with the simulators themselves. Second, many myths and rituals about organizational behavior indirectly influence simulator use.

Among the myths and rituals that surround the simulators are a number of commonly held false assumptions (Hammond, 1974; Schroeder, 1977). Such assumptions include several myths:

- a comprehensive decision system can be built;
- systems designers know what information is needed by decison makers;
- better systems will lead to better decisions;
- vendor-supplied management systems will meet institutional needs; and
- models are accurate.

Such myths produce a secure atmosphere for models because they reduce uncertainty. At the same time, however, they produce unrealistic expectations. Both builder and user must strive to be aware of such myths so that they can view the simulator more accurately.

Rituals affect simulators in a similar manner. "Getting the facts" may become a ritual without value if nothing is ever done with the "facts." Model builders may ritualistically apply one technique, such as linear programming, to every problem (Kirschling, 1976). Model building may become an end in itself. Technicians may arrive to correct problems whenever a model fails. Reports on the CAMPUS and RRPM pilot studies (Judy, 1969; Foreman, 1974; Hussain and Martin, 1971) demonstrate such exclusive concern with the technical issues. For the early simulators technical rituals overshadow use of the system.

EFPM appears to be avoiding this problem. EDUCOM publishes a monthly newsletter for EFPM's users (Jones et al., 1980). While the newsletters describe technical changes and improvements, they also contain stories about EFPM and its users. The stories report successful use of the model, new problems solved with its aid, and each institution's monthly use of the simulator. Instead of succumbing to the rituals that discourage use, EDUCOM is building new myths and rituals that support EFPM on the college or university campus.

Marz (1978) and Sapolsky (1972) note another influence of rituals on simulators. Many administrators invoke ritualistic behavior to provide solutions when they are faced with uncertainty. They may practice a ritual with the expectation that it guarantees wisdom and ensures the proper outcome. Ritualized systems also spread very quickly from one user to another. As Marz states:

> The only thing that is certain is that "new" administrative tools will be devised, that will be those adopted, and when perceived as "successful" will propagate rapidly...and that finally enthusiasm will wane and a new

> fad will occur. Indeed, it seems likely that one could model the spread of new administrative formula using the same equations epidemologists use to describe the outbreak, spread, and decline of an infectious disease (1978, p. 132).

This phenomenon is apparent in the growth of EFPM--four or five new institutions become EFPM users each month. Whether this will continue remains to be seen. If administrators follow this kind of ritualized behavior, they may find that the model is of less value than anticipated or that it is not at all suited to institutional needs.

Myths and rituals common to organizations also influence simulator use. The concept of a community of scholars (Goodman, 1962), for example, explains decision making in higher education. It states that institutions reach decisions by discussion and consensus among faculty and administrators. At most colleges the community-of-scholars concept is now a myth that provides a sense of stability and an explanation for the decision-making process. Managerial styles and techniques that run counter to this myth have a tendency to provoke hostility from the academic community. Faculty might view the introduction of a simulator as an attempt to subvert the communal process by placing the power of information in the hands of a few administrators.

But the community-of-scholars myth can be used constructively. The introduction of TRADES at Lehigh University includes plans to make the model available to the entire campus by placing it in the school's computer library (Ottervik, 1979). This will enable any member of the community, faculty or student, to experiment with the simulator. Easy access has several benefits.

It will reduce political pressures and may result in the discovery of new approaches to Lehigh's problems. More importantly, it will provide congruence with the community-of-scholars myth.

A second organizational myth describes the functions of managers. Mintzberg (1972, 1975) lists some of their commonly believed duties: planning, organizing, staffing, directing, coordinating, reporting, and budgeting. But he shows that managers are concerned less with hard facts and figures and more with intuition, hunches, opinions, and gossip. A modeler who believes the common myths about managerial activities may design a simulator that does not provide the kind of information that managers rely on. If the model produces information that decision makers ignore, the builder should redesign the simulator. A commonly held myth that explains the functions of managers may lead to simulators that are incompatible with the actual behavior of those who use them.

Cohen and March (1974) describe a third organizational myth--reliance on planning. Most college presidents profess a strong belief in comprehensive planning, a belief that should prompt the use of simulators. But there is little evidence that planning actually results in action. Instead, the planning process becomes a ritual, conducted, as Meyer and Rowan (1978) suggest, for the benefit of enhancing the legitimacy of the institution. In such an environment the modeler would be naive to think that the simulator would actually influence behavior. The concepts of myth and ritual introduce a paradox in the use of simulators. If planning is a ritual and does not lead to action, some might view the use of simulators as an unnecessary expense. Yet, using the simulator may enhance the legitimacy of the institution. It may provide stability or a sense of cohesion to a turbulent campus. It may also

explain certain actions or decisions. These are valid organizational benefits, even though they are not the intended use of the simulator.

At this point it is useful to take another look at an institution that has had apparent success with a simulator. The development of TRADES at Stanford University exemplifies the value of simulation for higher education. Many reasons explain the model's success. Among them are the influence of myth and ritual. Administrators who were going to use TRADES in the decision-making process designed it. The model used their individual policy preferences (Hopkins, Larreche, and Massy, 1977). This immediately helped ensure congruence between the model and users' personal myths and rituals. (One can also speculate that the technical backgounds of its builders reinforced myths that helped guarantee success.) Furthermore, they developed TRADES to solve a genuine problem, not as an institutional ritual.

Recently, critics of simulators have begun to realize that a model must become an integral part of the organization that uses it. Porter et al. (1979) discuss the "unique chemistry" and "idiosyncratic structure and priorities" of institutions. Rodgers and Rhodes (1978) state that a model must have "organizational validity." Wiseman (1979) suggests that models must arise from unstated institutional policies. All discuss unique institutional characteristics which are largely unstated or unrecognized and which are evoked to explain the institution's behavior. These concepts are similar in nature to myth and ritual.

Myth and ritual are difficult to indentify, yet their influence is profound. Clearly, their recognition would increase the chance of success for computer simulators. Careful introspection may provide some clues. Mitroff and Kilmann (1975) suggest, however, that direct approaches are likely to

drive myth and ritual further underground. Instead, they propose an indirect method. Mitroff and Kilmann feel that individuals project myths and rituals into stories they tell about their ideal organization. Interpretation of the stories uncovers the managers' myths and rituals. The administrator and modeler can then apply them to organizational behavior including the use of computer simulators.

Because myths and rituals frequently are unique to individuals and institutions, it is difficult to make broad prescriptions concerning their relationship to all computer simulators. But their effects are clearly present in the many examples cited above. Each simulator user must strive to be aware of their influence and ask the questions elicited by the previous discussion. Is the model's use only ritual? Does it contradict institutional myths about decision making? Do users share commonly held myths about simulators? If myths and rituals hinder use of the model, can their effects be avoided or diminished? Is there any way to use myths and rituals to benefit the simulator? Does the simulator legitimate institutional planning and the institution itself? Obviously, there are many reasons for the success and failure of computer simulators. Myth and ritual are two that administrators and modelers must strive to understand.

Footnotes

[1] In this paper the terms model and simulator will be used interchangably because in higher education nonsimulation models are the exception.

[2] Several sources provide more extensive surveys of the use of computer simulators in higher education. These include: Johnstone (1974); Gray (1977); Masland and Jackson (1980); Society for College and University Planning (1973); Schroeder (1973); and Weathersby and Weinstein (1970).

[3] RRPM is a product of the National Center for Higher Education Management Systems at the Western Interstate Commission for Higher Education in Boulder, Colorado.

[4] EDUCOM is a non-profit organization founded to promote the application of systems technology in colleges and universities.

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